

To: Nickle, Richard (ATSDR/DTHHS/OD)[ran2@cdc.gov]
From: Poulet, Chris
Sent: Thur 8/13/2015 2:41:49 PM
Subject: RE: Animas River Spill - Data Review

Hi Rich

Thanks for this analysis.

Chris

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From: Nickle, Richard (ATSDR/DTHHS/OD) [mailto:ran2@cdc.gov]
Sent: Thursday, August 13, 2015 7:45 AM
To: Holler, James S. (Jim) (ATSDR/DTHHS/OD)
Cc: Cseh, Larry (ATSDR/DTHHS/OD); Poulet, Chris; Young, Patrick; Knowles, Robert; Pettigrew, George; Strausbaugh, Dan; Murray, Ed (ATSDR/DTHHS/OD); Stephens, James W. (ATSDR/DTHHS/OD)
Subject: Animas River Spill - Data Review

I went through the EPA data from the website in some detail. This data has failed validation for a number of reasons but I think most of them have to do with the quantification of the individual concentrations, mostly with the total metals analysis. There are some things beyond the numbers that I think can be discerned. From those, some tentative conclusions can be made.

As usual with most inorganic analysis of water samples, EPA looked at dissolved metals and total metals. The difference between these values represent the suspended solids in the water column. While the total metals analysis, especially in Cement Creek (i.e., above Silverton), have a number of metals above our drinking water comparison values, the dissolved fraction is generally below those comparison values. This implies that the metals are complexed into insoluble salts suspended in solution. Looking at some of the photos of the meter readings on the private side of the EPA website, It looks like, as the pH rose to around 5 due to dilution, the insoluble salts precipitated out of solution. This pH of 5 coincides with the vicinity of the mouth of Cement Creek (i.e., where the creek flowed into the Animas River). Unless something happened to reduce the pH below 5 again, these salts would remain undissolved but suspended in the water.

In addition, the flow rate at the USGS gage in the Animas River near Silverton is about 10 times the flow of Cement Creek at the gage near the Creek's mouth and the flow rate of the San Juan River near Farmington, NM is about 10 times the flow rate of the Animas. While the surge is clearly discernible as a peak in the flows in the Animas River near Silverton, there is no such peak in the San Juan. With this amount of water moving this fast, it is unlikely that the pH would change significantly or that the suspended solids will drop out of solution. They would likely be diluted first and only drop out of solution completely when the water slows down (probably in Lake Powell).

What I think that means is that we have what amounts to an insoluble salt spill from Silverton downstream. The salinity of Cement Creek rivals the salinity of the Gulf of Mexico samples we saw during Deepwater. That would imply a couple of things.

- Unless there is some kind of preferential subterranean channel from the rivers south of Silverton to private wells uncased in the unconfined uppermost aquifers, the pollution in the rivers would not reach the wells. The suspended solids would, in essence, be filtered by the intervening soils.

- When the sediment is removed from the water column, the contaminants will be removed with it. Almost any water treatment plant that uses surface water can filter dirt out of the water column. Therefore, it is unlikely that any of the water systems would be adversely affected.

As for the color, according to the USGS mineral database, this area has a high concentration of iron (from around 5% up to 25%). The data in the Animas River is reporting concentrations at several stations of from 6% up to 89% iron in the total metals analysis with less than 1% iron in the dissolve fractions. In Cement Creek, the dissolved iron is between 1-2%. Chances are the Gold King Mine is a better source of iron than gold. As the concentration of iron decreases from dilution or sedimentation, the color should go away.

To the extent this is correct, this event is an ecological threat, not a human health one.

Rich Nickle

ATSDR Emergency Response